

# Hairy Cell Leukemia Is Infrequent in México and Has a Geographic Distribution

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Considering that the prevalence of some hematologic malignancies may have a geographic distribution that could be related with its etiology, a group of 2,387 patients with acute leukemia (1,968 adults and 419 children) was studied along a 5-year period in six different locations within México. Twenty-seven patients (16 males and 11 females) with hairy cell leukemia (HCL) were identified. The adjusted overall porportion of HCL, after excluding data from centers reporting only adults, was 1.12% of all leukemia cases; this figure is lower than that reported in the United States or England. The proportion of adult leukemic patients with HCL was significantly higher in the northern region of the country—where there are more people devoted to farming and agricultural activities—as compared with the central or southeastern regions (3.07 vs. 1.03% vs. 0%;  $P < 0.05$ ); possible explanations for these differences are briefly discussed. © 1996 Wiley-Liss, Inc.

**Key words:** leukemia, hairy cell, epidemiology, geography

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## INTRODUCTION

Hairy cell leukemia (HCL) is an uncommon B-cell leukemia, primarily affecting older male persons [1]. There are few data on the epidemiology of the disease: its overall incidence has been estimated at 2.9 per million/year (4.0 for males and 1.7 for females) in England [2], and at 2.9 for males and 0.6 for females in the United States [3]. HCL accounts for 2% of all leukemia cases in the United States [3].

Some hematologic malignancies may have a geographic distribution within different countries [4]. For example, it is noteworthy the low prevalence of chronic lymphocytic leukemia in México, a malignancy that represents up to 30% of leukemias in caucasians [1], only 6.7% of leukemias in México [5], and less than 5% in Asia [1]. Genetic and occupational differences, local conditions, and infectious agents have been mentioned in an effort to explain these findings [4–6]. The seemingly unequal distribution of HCL cases in different areas of

the country prompted a more detailed investigation on the epidemiologic characteristics of this disease in México. We found a significantly higher prevalence of HCL in the states of the country in which more people devoted to farming and agricultural activities live. In addition, we found that HCL is less frequent in México than in the United States or England.

## MATERIAL AND METHODS

A questionnaire requesting data on the number of different types of leukemia cases studied during the past 6

Received for publication February 20, 1996; accepted March 6, 1996.

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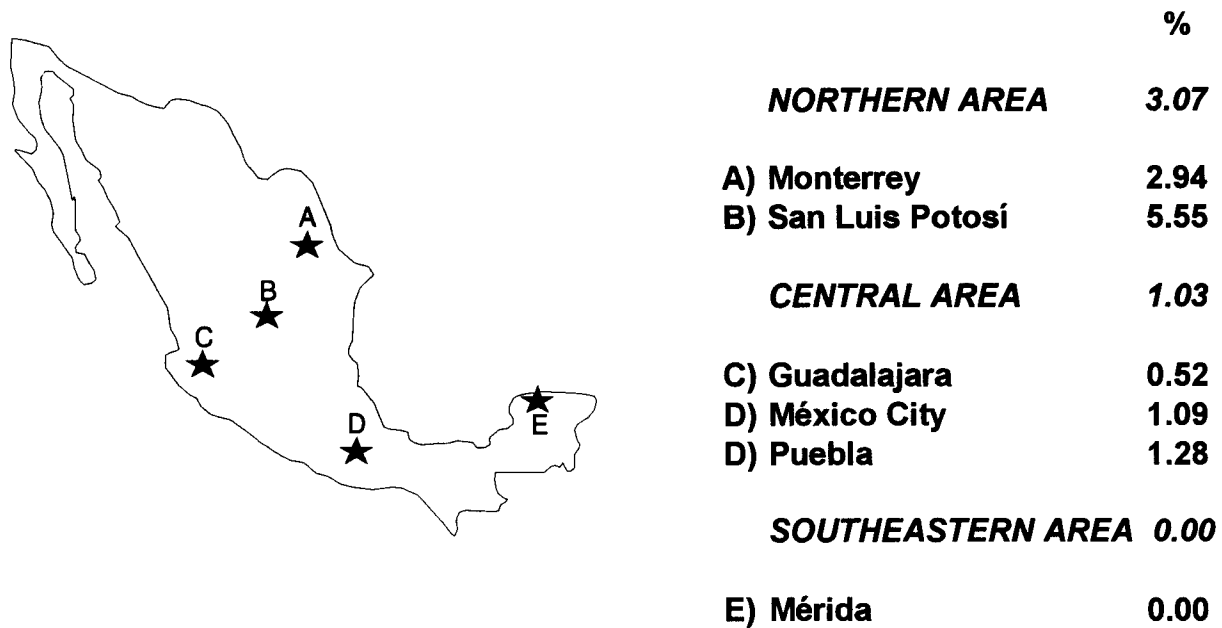


Fig. 1. Proportion of cases of hairy cell leukemia per total number of adult leukemia cases, reported in each location, and its geographic distribution. %, percentage of all adult leukemia cases; D, the locations of México City and Puebla are depicted in the same star.

years (1991–1995) was sent to 16 board-certified hematologists, active members of the Agrupación Mexicana para el Estudio de la Hematología, living in nine different cities located in three areas within the country. Most of them are chairmen of the departments of Hematology and Oncology of their hospitals, which have similar diagnostic capabilities. Adjustments were made considering that the two medical centers in México City deal only with adult patients (above 18 years of age).

## RESULTS

Eight hematologists provided enough information with which to analyze the cases of leukemia from six different locations within the country: two of them located in the northern region (Monterrey: 553 patients, and San Luis Potosí: 44 patients), three in the central region (Guadalajara: 281 patients; México City: 1,284 patients; Puebla, 118 patients) and one in the southern region (Mérida: 107 patients) (Fig. 1). A total of 2,387 cases of leukemia (1,968 adults and 419 children) were identified during this 5-year period. Twenty-seven patients with HCL were diagnosed; 13 were reported from centers dealing with both children and adults and accordingly, representing 1.17% of all acute leukemia cases. There were 16 males and 11 females, the median age was 63 years, with a range of 33–93. The proportion of HCL cases within the adult

leukemias in the northern locations (Monterrey and San Luis Potosí) was significantly higher than in the central locations (México City, Guadalajara, and Puebla) or in the southern location (Mérida) (3.07 vs. 1.03 vs. 0%, respectively;  $P < 0.05$  using the proportions equalness hypothesis) (Fig. 1). The distribution of the identified cases did not show a chronological tendency during the 6-year period analyzed.

## DISCUSSION

The etiology of HCL remains unknown [1], but occupational exposures have been mentioned, particularly benzene and solvents [7–10]. It has recently been shown that there is an association between HCL risk and agricultural jobs, mainly with farming, agricultural, and forestry working [10]; accordingly, speculations about solvent exposure of these workers have been done [10]. Inasmuch as the northern states of México are inhabited by more farmers and agricultural workers, as compared with the states located in central or southern regions, it might be speculated that this could account for some of the observed differences in this study; however, other reasons should be explored. Adjusting for data from centers reporting children and adults, it is interesting that the proportion of HCL cases in the northern locations in México (1.83% of all leukemias) is similar to that reported in the

Los Angeles county in the United States (2%), located close to the Mexican–American border [3] and higher than that recorded in the rest of México (0.3%). On the other hand, the overall adjusted proportion of HCL in leukemic patients in México was lower (1.12%), than that recorded for both the United States and England, in which HCL represents around 2% of all leukemia cases [2,3]; this could also be related to occupational differences; however the racial distribution that has been recorded for other lymphoid malignancies [4–6] could also play a role.

Inasmuch as some of the data reported by the hematologists represent statistics of large hospitals or referral centers, calculations of the prevalence of the disease in the locations studied are not possible. On the same line, it is interesting that in the population of adult patients analyzed, from two large referral hospitals in México City (Instituto Nacional de la Nutrición Salvador Zubirán and Centro Médico Nacional Siglo XXI), the number of HCL patients was 14 out of 1,284 adult leukemia cases (1.09%). Despite being large referral medical centers for patients from all the country, the proportion of HCL, that could in turn be biased, was significantly lower than that recorded in the two northern locations (3.07%).

These data suggest that HCL is less frequent in México than in the United States and England. Within the country, HCL shows a geographic distribution that is more prevalent in regions inhabited by a larger number of agricultural workers and farmers.

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